

A DIGITAL MAP ON THE INTERNET: DAWLISH WARREN, DEVON

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ABSTRACT

This third paper in a short series presents an up-to-date digital map of a classic British coastal landform, Dawlish Warren in Devon, applying the same PC-based mapping techniques as the two previous maps, but making the final document available through the Internet. © 1998 John Wiley & Sons, Ltd.

KEY WORDS: Dawlish Warren; coastal geomorphology; digital mapping; Internet

INTRODUCTION

This short paper provides the background to the third in a series of vector-based digital geomorphological maps of classic British coastal landforms undertaken by the author, to a common mapping specification. Maps of Hurst Castle Spit (Collin, 1996) and Blakeney Point (Collin, 1997) were published in the CORELDRAW! format (.cdr), chosen as the most commonly available vector graphics software worldwide and in the UK. The presentation media then standard for the *Technical and Software Bulletin* was the floppy disk. This third map, of Dawlish Warren in Devon, is different largely in that the chosen presentation is through the Internet, in common with all other files associated with papers in the current *Bulletin*.

Sand and shingle spits continue to be regarded as amongst the most interesting physical forms in the coastal zone, so this third map should be of value to a wide variety of field and desktop investigators. The basics of both producing and applying the map in CORELDRAW! require only limited recapitulation – the two previous papers cover these aspects in sufficient detail. The feature mapped is similar in areal extent to Hurst Castle Spit, though significantly smaller than Blakeney Point; the apparently reduced magnitude of the mapping work is offset in data terms by the larger scale and higher level of detail included.

The decision to utilize the Internet reflects the inexorable rise of this as *the* means of disseminating information freely to the widest possible group of users. The use of embedded files in Web documents is now commonplace, and there is no reason why this should not include complete vector graphics files as long as a compatible software package is resident on the host PC.

THE LANDFORM: DAWLISH WARREN

Dawlish Warren is arguably the most accessible of the three landforms so far mapped. It is a popular base for field studies at all levels and, as a Local Nature Reserve (LNR) administered jointly by Teignbridge District Council and the Devon Wildlife Trust, has a warden and an Interpretation Centre to both inform the general public and to facilitate scientific field investigations. The Warren is also a Site of Special Scientific Interest (SSSI) and part of a larger 'Ramsar' site and Special Protection Area (Teignbridge District Council, 1978). It is a feature the whole length of which may be walked without undue exertion, in this sense contrasting with Hurst Castle Spit and markedly so with the energy-sapping Blakeney Point, in part because it is, superficially at least, largely a sand rather than a shingle spit.

In terms of morphology, the fascination of Dawlish Warren lies in the fact that it is a double spit. The older spit, known as the Inner Warren, is a completely stable feature up to 250 m across, utilized as a small links golf

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course. The more recent Outer Warren was regarded by Kidson (1950, 1963, 1964) as highly vulnerable to breaching, being topped by a line of active dunes, historically up to 300m across, but in 1963 reduced as low as 30m in places. In fact, Kidson saw little future for Dawlish Warren, but since then the limited remnants of the Outer Warren have been reinforced by a series of sea walls, gabions and groynes. Between the Inner and Outer Warrens is a low area known as the Greenland Lake, formerly a tidal creek, but now stabilized by terrestrial vegetation and cut off from tidal inundation. The distal end of the spit is the least stable part of the whole feature, fixed neither in position nor in extent. Kidson showed this, comparing maps for the distal reaches from 1851 to 1960, but later and recent Ordnance Survey (OS) maps at the 1:10 560, 1:10 000 and 1:2500 scales confirm that Warren Point, as it is known, continues to fluctuate in position and extent in no discernibly predictable fashion.

The position of Dawlish Warren at the mouth of the Exe estuary has always attracted management concerns. The landform has been declining in size more or less since the building of the Great Western Railway at Dawlish, in 1849, which effectively cut off the primary source of longshore sediment nourishment. Teignbridge District Council Engineer's Department and the Environment Agency have a substantial knowledge of the previously noted coastal defence and management measures constructed in the southwestern part of the spit in 1971 and 1992. The Warren also falls within the sphere of the Exe Estuary Management Project, a multi-agency initiative administered by Devon County Council, which has assembled much information about the environs.

Despite the wide interest in the morphology and the management of Dawlish Warren, little in the way of systematic observations have been undertaken and published in recent years, though innumerable university dissertations and school projects would no doubt furnish some useful comparative data; copies of a few of these documents are held at the Interpretation Centre. Nor has there been a dedicated large-scale map produced in recent times. The latest large-scale digital OS plans contain limited physical information and form only the basis for further mapping rather than notably useful documents in themselves. It is anticipated that the map associated with this paper will serve the requirements of most categories of Earth scientist and similarly enable more specialist botanical investigations.

THE 1997 SURVEY

The basis of the digital map is a 1:6000 scale photogrammetric survey utilizing aerial photography specially flown for the author at low tide on 3 December 1997, by the University of Cambridge. Six stereoscopic overlaps were involved, ground control having been surveyed by the author in January 1998. Plotting was then carried out on a Kern PG2-L stereoplotter. Details of the geomorphological specification are unnecessary here, being evident on the map itself; this accords with the established aims for the series of maps (Collin, 1996). Mean High and Low Water Marks of Medium Tides are included, these having been computed from Admiralty Tide Tables in the approved manner.

DIGITAL CARTOGRAPHY

No substantial differences exist in the creation of the digital map from the approaches employed with the Hurst Castle and Blakeney maps. The photogrammetric map is scanned as individual machine plots for each overlap into a Mackintosh Performa 5200 with ADOBE ILLUSTRATOR V7.0 software. The compilation and conversion to a vector-graphic plot is accomplished as a series of 'layers' associated with the different components of the total information content. Readers are invited to refer to the papers previously indicated (Collin, 1996, 1997) for a fuller description of this process.

For the purposes of this paper the image file is then also converted into a CORELDRAW! V3.0 file to be placed on the Web page. Though later versions of CORELDRAW! up to V8.0 are in existence, the continuing mass availability of V3.0 at give-away prices will encourage the acquisition of this versatile graphics software (in fact, V3.0 was actually given away free, with no restrictions on use, as the cover CD on *PC Advisor* for April 1998!).

OPENING THE MAP FILE

To gain access to the digital map, users must access the publisher's Web address, <http://www.wiley.co.uk>. Follow the instructions on the relevant *Earth Surface Processes and Landforms* page <http://www.interscience.wiley.com/jpages/0197-9337/sites.html>. This will involve simply double-clicking on the highlighted embedded CORELDRAW! file 'Dawlish.cdr'. A version for ILLUSTRATOR users is also provided, 'Dawlish.ai'. As long as the relevant software, or some other compatible vector-graphics software, is resident on the PC platform being utilized, the map should open quickly. If serious further work offline is intended, the file may then be saved into a suitable directory.

USING THE MAP

Once again, it is deemed unnecessary to repeat in detail the various ways of utilizing the map provided, reference to previous papers in the series being presumed to be possible. As with all vector-graphics, the map may be rescaled, edited, added to, viewed in whole or in part, certain layers only displayed, and any of these variations then printed for field use or for desk comparison with other maps of the same area. Clearly, some reasonable familiarity with CORELDRAW! is necessary for this. It is also practicable to export the file at any stage in something like a .dxf format for handling in CAD software or within GIS systems, though users should realize that CORELDRAW! or ILLUSTRATOR fill characteristics will disappear.

As previously, individual academic users are free to utilize and pass on the digital map to other individual users in whatever way they see fit – this is indeed the whole purpose of making the data available in digital format. What is specifically prohibited is institutional production of multiple copies of a conventionally printed paper map from this data source.

SUMMARY

The previous Hurst Castle and Blakeney maps demonstrated that it is possible to produce digital maps with a specialist geomorphological content, in a simple, non-technical process and in a format which makes them accessible to a wide range of potential Earth science users. The present paper and map of Dawlish Warren show that the dissemination of such data sources is now much easier than ever before, utilizing the Internet. Even unlinked to the reading of the *Technical and Software Bulletin*, potential users can access the map in all its vector detail with a few strokes of the PC keyboard.

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